



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,334	09/02/2005	Graham P. Hopkins	41557-211404	3042

26694 7590 06/20/2007
VENABLE LLP
P.O. BOX 34385
WASHINGTON, DC 20043-9998

EXAMINER

LEE, SHUN K

ART UNIT	PAPER NUMBER
----------	--------------

2884

MAIL DATE	DELIVERY MODE
-----------	---------------

06/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/516,334

Applicant(s)

HOPKINS ET AL.

Examiner

Shun Lee

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-48 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 26-48 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20041130, 20050902.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

National Stage Application

1. The Examiner acknowledges consideration of the International Preliminary Examination Report in International Application PCT/GB03/02341. MPEP § 1893.03(e).

Information Disclosure Statement

2. The information disclosure statement filed on 2 September 2005 does not fully comply with the requirements of 37 CFR 1.98 because: it lacks a legible copy of each foreign patent. It appears that only translated abstracts were provided for some of the foreign patents. Since the submission appears to be *bona fide*, applicant is given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b). Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
The full name of each inventor (family name and at least one given name together with any initial) has not been set forth.

Specification

4. The disclosure is objected to because of the following informalities: "source 3" in line 24 on pg. 6 should probably be --source 6-- (37 CFR 1.437 and PCT Rule 11.13(m)). Appropriate correction is required.

Claim Objections

5. Claims 26, 29, 33, 34, 37, 45, and 48 are objected to because of the following informalities:

(a) in claim 26, "of the type" on line 1 should probably be deleted (see

MPEP § 2173.05(b));

(b) in claim 26, "optical source" on line 9 should probably be --source--;

(c) in claim 29, "at least" on line 1 should probably be deleted;

(d) in claim 29, "two surfaces of part ellipsoidal shape to the other" on line 3 should probably be --at least two surfaces of part ellipsoidal shape to another of said at least two surfaces of part ellipsoidal shape--;

(e) in claim 33, "optical source" on line 1 should probably be --source--;

(f) in claim 34, "other" on line 1 should probably be deleted;

(g) in claim 37, "two reflective" on line 1 should probably be --at least two reflective--;

(h) in claim 45, "optical source" on line 1 should probably be --source--; and

(i) in claim 48, "travelling form" on line 3 should probably be --traveling from--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 26, 29, 31-34, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by McCaul *et al.* (US 5,625,189).

In regard to claims 26 and 31-33, McCaul *et al.* disclose (Figs. 25-28) a gas sensor of the type having a housing defining a chamber within which light is transmitted from a source (2131) to a detector (2137) through an optical path within the chamber, comprising:

- (a) a source (2131) arranged to provide light to a detector (2137) through an optical path;
- (b) at least two reflective surfaces (2135) of part ellipsoidal shape (column 22, lines 48-60) arranged to reflect light from the source (2131) to the detector (2137) through the optical path;

wherein the detector (2137) is arranged to detect light only from a predetermined directional range (comprising a predetermined solid angle substantially centered on an axis of the detector), and wherein the source is arranged to emit light in a predetermined directional range (comprising a predetermined solid angle substantially centered on an axis of the source), such that only light transmitted

through the optical path via the at least two reflective surfaces (2135) is detected by the detector (2137).

In regard to claim **29** which is dependent on claim 26, McCaul *et al.* also disclose (Figs. 25-28) at least a first planar surface (2136) arranged within the optical path so as to reflect light from one of the two surfaces (2135) of part ellipsoidal shape to the other.

In regard to claim **34** which is dependent on claim 26, McCaul *et al.* also disclose that at least one other portion of the chamber comprises means (*i.e.*, on-airway; column 4, lines 13-19) for admitting gas into the chamber.

In regard to claim **45** which is dependent on claim 26, McCaul *et al.* also disclose (column 6, lines 32-48) that the optical source is an infrared source.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 2884

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 26, 29-34, and 36-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parry *et al.* (US 5,973,326) in view of Wong (US 5,384,640).

In regard to claims **26** and **31-33**, Parry *et al.* disclose (Figs. 1 and 2) a gas sensor of the type having a housing (2) defining a chamber within which light is transmitted from a source (5) to a detector (6) through an optical path within the chamber, comprising:

- (a) a source (5) arranged to provide light to a detector (6) through an optical path;
- (b) at least two reflective surfaces (7, 8) of part ellipsoidal shape (column 3, lines 32-36) arranged to reflect light from the source (5) to the detector (6) through the optical path;

wherein the detector (6) is arranged (*i.e.*, wall 10 and additional shielding; column 3, lines 60-63) to detect light only from a predetermined directional range (comprising a predetermined solid angle substantially centered on an axis of the detector) such that only light transmitted through the optical path via the at least two reflective surfaces (7, 8) is detected by the detector (6).

The sensor of Parry *et al.* lacks an explicit description that the source is arranged to emit light in a predetermined directional range (comprising a predetermined solid angle substantially centered on an axis of the source). However, Parry *et al.* also disclose (column 1, lines 55-57) that any source or detector may be used. Since Parry *et al.* do not disclose and/or require a specific source, one having ordinary skill in the art at the

Art Unit: 2884

time of the invention would reasonably interpret the unspecified source of Parry *et al.* as any one of the known conventional sources that would not require further description. Further, Wong teaches (column 3, lines 10-16; Fig. 1) that a source for a gas sensor is a semiconductor laser having a predetermined solid angle substantially centered on an axis of the laser. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a conventional source (e.g., a semiconductor laser having a predetermined solid angle substantially centered on an axis of the laser) as the unspecified source in the sensor of Parry *et al.*

In regard to claim 29 which is dependent on claim 26, Parry *et al.* also disclose (Figs. 1 and 2) at least a first planar surface (9) arranged within the optical path so as to reflect light from one of the two surfaces (7, 8) of part ellipsoidal shape to the other.

In regard to claim 30 which is dependent on claim 29, Parry *et al.* also disclose (Figs. 1 and 2) a second surface (3) with at least two reflective regions arranged within the optical path to reflect light between the reflective surfaces (7, 8) of part ellipsoidal shape and the first planar surface (9).

The claim limitation "means for admitting gas into the chamber" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure (i.e., "regions 17" and "inlet 18" as illustrated in Figs. 1 and 1a) described in the specification (e.g., "regions 17 of the cylindrical wall 3 not providing reflective surfaces for the light may include particulate filters, mesh or sintered material" in lines 10-28 on pg. 9) and equivalents thereof (MPEP § 2181).

In regard to claim **34** which is dependent on claim 26, Parry *et al.* also disclose that at least one other portion of the chamber comprises means (*i.e.*, apertures or openings; column 3, lines 25-28 and 58-60) for admitting gas into the chamber.

In regard to claim **36** which is dependent on claim 34, the sensor of Parry *et al.* lacks an explicit description that the gas admittance means includes a particulate filter. However, Parry *et al.* also disclose (column 3, lines 25-28 and 58-60) apertures or openings for admitting gas into the chamber. Since Parry *et al.* do not disclose and/or require a specific gas aperture, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified gas aperture of Parry *et al.* as any one of the known conventional gas apertures that would not require further description. Further, Wong teaches (column 3, lines 47-57) that an aperture comprises a semipermeable membrane (*i.e.*, a particulate filter) for keeping large particles from entering the gas sensor. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a conventional aperture (*e.g.*, an aperture comprising a particulate filter) as the unspecified aperture in the sensor of Parry *et al.*, in order to keep large particles from entering the gas sensor.

In regard to claim **37** which is dependent on claim 26, Parry *et al.* also disclose (Figs. 1-3) that the two reflective surfaces (7, 8) define foci (column 3, line 64 to column 4, line 35) at which the source (5) and detector (6) are located and a planar reflective surface (9) defines part of the optical path between them.

In regard to claim **38** which is dependent on claim 26, Parry *et al.* also disclose (Figs. 1-3; column 3, line 64 to column 4, line 35) that the source (5) is at a focus of a

Art Unit: 2884

first part ellipsoidal surface (a) and the detector (6) is at a focus of a second part ellipsoidal surface (b) and the first and second ellipsoids share a common virtual focus (12).

In regard to claim **39** which is dependent on claim 26, Parry *et al.* also disclose (Figs. 1 and 2; column 3, lines 16-18) that the source (5) and detector (6) are contained within a flameproof housing (2).

In regard to claim **40** which is dependent on claim 26, Parry *et al.* also disclose (Figs. 1 and 2) that the housing (2) comprises a cylinder having end walls (3, 4).

In regard to claim **41** which is dependent on claim 40, Parry *et al.* also disclose (Figs. 1 and 2) that the source (5) and detector (6) are mounted on a common first end wall (4) of the housing (2).

In regard to claims **42-44** which are dependent on claim 41, the sensor of Parry *et al.* lacks an explicit description that a planar reflector comprises a central region of a second end wall and a gas admittance means comprises a peripheral region of the second end wall and a region of the cylinder adjacent the second end wall. However, Parry *et al.* also disclose (column 1, line 66 to column 2, line 6; column 3, lines 25-28 and 58-60) to provide discontinuous reflective coatings on curved regions (7 and 8 in Fig. 1) and planar regions (3 and 9 in Fig. 1) and apertures or openings for admitting gas into the chamber. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide apertures at locations (e.g., at peripheral region of the second end wall and a region of the cylinder adjacent the second end wall)

Art Unit: 2884

that would not interfere with the locations of the reflectors (e.g., planar reflector 3 at a central region of a second end wall) in the sensor of Parry *et al.*

In regard to claim **45** which is dependent on claim 26, Parry *et al.* also disclose (column 3, lines 18-21) that the optical source is an infrared source.

In regard to claim **46** which is dependent on claim 26, Parry *et al.* also disclose (column 2, lines 21-26) that the source is arranged to heat substantially all the surfaces from which light is reflected to a temperature above ambient temperature.

In regard to claim **47** which is dependent on claim 26, Parry *et al.* also disclose (Figs. 1 and 2) a reference detector (11) located adjacent the detector (6) so that the reference detector (11) and the detector (6) collect light that has traveled similar optical paths.

In regard to claim **48** which is dependent on claim 47, the sensor of Parry *et al.* lacks an explicit description that one of the two reflective surfaces is shaped so as to form portions of a pair of overlapping part ellipsoidal surfaces, whereby light traveling from the source to the detector and reference detector travels the same optical path as far as the pair of overlapping part ellipsoidal surfaces and is split for the last portion of the distance. However, Parry *et al.* also disclose (column 3, lines 54-56) to provide a reference sensor to compensate for changes in operating conditions and with time. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a pair of overlapping part ellipsoidal reflective surface surfaces in the sensor of Parry *et al.*, in order for the reference detector to have the

Art Unit: 2884

same optical geometry as the measurement detector so as to compensate for changes in operating conditions and with time.

11. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parry *et al.* (US 5,973,326) in view of Wong (US 5,384,640) as applied to claim 26 above, and further in view of Weiner (US 4,024,397).

In regard to claims **27** and **28** which are dependent on claim 26, the sensor of Parry *et al.* lacks an explicit description that the sensor includes an optical element (comprising an immersion lens) to select a range of angles of acceptance. However, Parry *et al.* also disclose (column 1, lines 55-57) that any source or detector may be used. Since Parry *et al.* do not disclose and/or require a specific detector, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified detector of Parry *et al.* as any one of the known conventional detectors that would not require further description. Further, Weiner teaches (column 1, lines 6-27) that an immersed infrared detector provides increase detectivity. It should be noted that a lens inherently have a field of view less than 4π steradians. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a conventional detector (e.g., an immersed infrared detector having a desired field of view) as the unspecified detector in the sensor of Parry *et al.*

12. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parry *et al.* (US 5,973,326) in view of Wong (US 5,384,640) as applied to claim 34 above, and further in view of Wilkins *et al.* (US 3,749,495).

In regard to claim 35 which is dependent on claim 34, the sensor of Parry *et al.* lacks an explicit description that the gas admittance means includes sintered material. However, Parry *et al.* also disclose (column 3, lines 25-28 and 58-60) apertures or openings for admitting gas into the chamber. Since Parry *et al.* do not disclose and/or require a specific gas aperture, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified gas aperture of Parry *et al.* as any one of the known conventional gas apertures that would not require further description. Further, Wong teaches (column 3, lines 47-57) that an aperture comprises a semipermeable membrane (*i.e.*, a particulate filter) for keeping large particles from entering the gas sensor. In addition, Wilkins *et al.* teach (column 5, lines 20-24) that particulate filters comprising sintered material are commercially available. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a conventional aperture (*e.g.*, an aperture comprising sintered material) as the unspecified aperture in the sensor of Parry *et al.*, in order to keep large particles from entering the gas sensor.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2884

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SL


CONSTANTINE HANNAHEER
PRIMARY EXAMINER